Code No: NR220303 **NR** **Set No. 2**

II B.Tech II Semester Examinations,December 2010
THERMAL ENGINEERING - I
Mechanical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) How do you classify the refrigerants?
   (b) Define the term air conditioning? And explain their uses and applications. [8+8]

2. (a) A diesel engine has a compression ratio of 14 to 1 and the fuel supply is cut off at 0.08 of the stroke. If the mass of the fuel is 0.2685 kg/kWh, having calorific value of 43700 kj/ kg. Determine the relative efficiency of the engine.
   (b) Define volumetric efficiency for a four stroke cycle engine. [16]

3. A dense air refrigerating system works between pressure of 20 bar and 4 bar to produce 25 tons of refrigeration. The air temperature leaving the refrigerating coil is -8^{0}C and the air temperature leaving the air cooler is 16^{0}C. Calculate
   (a) power required,
   (b) mass of air circulated per minute,
   (c) COP and
   (d) piston displacement of compressor and expander. [16]

4. (a) Explain the working of a four stroke c.i. engine with a neat sketch.
   (b) Explain the mechanism for load control in c.i. engines. [16]

5. (a) What is meant by ignition delay? Name and describe the two components of ignition delay period. What is the importance of delay period? Should the delay period be zero?
   (b) What are the factors, which affect the delay period in C.I Engines? Explain briefly the effect of each of them. [8+8]

6. (a) Indicate the pressure and velocity variation across the centrifugal compressor.
   (b) A single inlet type centrifugal compressor handles 8 kg/s of air with ambient temperature of 20^{o}C. The compressor runs at 2200 rpm with an isentropic η of 82% . Determine the power required if the air is compressed from a stator pressure of 1 bar to 4.2 bar stagnat pressure. Air enters the impeller eye with a velocity of 150 m/s with no prewhirl. [16]

7. (a) State the uses of compressed air in engineering.
   (b) Working from first principles, derive an expression for work done on air in a reciprocating compressor in terms of the pressure ratio. [6+10]

8. (a) How can be the possibility of detonation be reduced at the design stage in S.I. engines.

   (b) Explain the desirable point in the cycle to obtain the peak pressure and discuss its importance. [16]

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Code No: NR220303 **NR** **Set No. 4**

II B.Tech II Semester Examinations,December 2010
THERMAL ENGINEERING - I
Mechanical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) A diesel engine has a compression ratio of 14 to 1 and the fuel supply is cut off at 0.08 of the stroke. If the mass of the fuel is 0.2685 kg/kWh, having calorific value of 43700 kj/ kg. Determine the relative efficiency of the engine.
   (b) Define volumetric efficiency for a four stroke cycle engine. [16]

2. A dense air refrigerating system works between pressure of 20 bar and 4 bar to produce 25 tons of refrigeration. The air temperature leaving the refrigerating coil is -8^{0}C and the air temperature leaving the air cooler is 16^{0}C. Calculate
   (a) power required,
   (b) mass of air circulated per minute,
   (c) COP and
   (d) piston displacement of compressor and expander. [16]

3. (a) Indicate the pressure and velocity variation across the centrifugal compressor.
   (b) A single inlet type centrifugal compressor handles 8 kg/s of air with ambient temperature of 20°C. The compressor runs at 2200 rpm with an isentropic η of 82%. Determine the power required if the air is compressed from a stator pressure of 1 bar to 4.2 bar stagnat pressure. Air enters the impeller eye with a velocity of 150 m/s with no prewhirl. [16]

4. (a) State the uses of compressed air in engineering.
   (b) Working from first principles, derive an expression for work done on air in a reciprocating compressor in terms of the pressure ratio. [6+10]

5. (a) Explain the working of a four stroke c.i. engine with a neat sketch.
   (b) Explain the mechanism for load control in c.i. engines. [16]

6. (a) How can be the possibility of detonation be reduced at the design stage in S.I. engines.
   (b) Explain the desirable point in the cycle to obtain the peak pressure and discuss its importance. [16]

7. (a) What is meant by ignition delay? Name and describe the two components of ignition delay period. What is the importance of delay period? Should the delay period be zero?

(b) What are the factors, which affect the delay period in C.I Engines? Explain briefly the effect of each of them. [8+8]

8. (a) How do you classify the refrigerants?

(b) Define the term air conditioning? And explain their uses and applications. [8+8]

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Code No: NR220303 **NR** **Set No. 1**

II B.Tech II Semester Examinations,December 2010
THERMAL ENGINEERING - I
Mechanical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) How do you classify the refrigerants?
   (b) Define the term air conditioning? And explain their uses and applications. [8+8]

2. A dense air refrigerating system works between pressure of 20 bar and 4 bar to produce 25 tons of refrigeration. The air temperature leaving the refrigerating coil is -8^{0}C and the air temperature leaving the air cooler is 16^{0}C. Calculate
   (a) power required,
   (b) mass of air circulated per minute,
   (c) COP and
   (d) piston displacement of compressor and expander. [16]

3. (a) A diesel engine has a compression ratio of 14 to 1 and the fuel supply is cut off at 0.08 of the stroke. If the mass of the fuel is 0.2685 kg/kWh, having calorific value of 43700 kj/ kg. Determine the relative efficiency of the engine.
   (b) Define volumetric efficiency for a four stroke cycle engine. [16]

4. (a) What is meant by ignition delay? Name and describe the two components of ignition delay period. What is the importance of delay period? Should the delay period be zero?
   (b) What are the factors, which affect the delay period in C.I Engines? Explain briefly the effect of each of them. [8+8]

5. (a) Explain the working of a four stroke c.i. engine with a neat sketch.
   (b) Explain the mechanism for load control in c.i. engines. [16]

6. (a) State the uses of compressed air in engineering.
   (b) Working from first principles, derive an expression for work done on air in a reciprocating compressor in terms of the pressure ratio. [6+10]

7. (a) Indicate the pressure and velocity variation across the centrifugal compressor.
   (b) A single inlet type centrifugal compressor handles 8 kg/s of air with ambient temperature of 20^{o}C. The compressor runs at 2200 rpm with an isentropic η of 82% . Determine the power required if the air is compressed from a stator pressure of 1 bar to 4.2 bar stagnat pressure. Air enters the impeller eye with a velocity of 150 m/s with no prewhirl. [16]

8. (a) How can be the possibility of detonation be reduced at the design stage in S.I. engines.

   (b) Explain the desirable point in the cycle to obtain the peak pressure and discuss its importance. [16]

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Code No: NR220303 **NR** **Set No. 3**

II B.Tech II Semester Examinations,December 2010
THERMAL ENGINEERING - I
Mechanical Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. A dense air refrigerating system works between pressure of 20 bar and 4 bar to produce 25 tons of refrigeration. The air temperature leaving the refrigerating coil is -8^{0}C and the air temperature leaving the air cooler is 16^{0}C. Calculate
   (a) power required,
   (b) mass of air circulated per minute,
   (c) COP and
   (d) piston displacement of compressor and expander. [16]

2. (a) What is meant by ignition delay? Name and describe the two components of ignition delay period. What is the importance of delay period? Should the delay period be zero?
   (b) What are the factors, which affect the delay period in C.I Engines? Explain briefly the effect of each of them. [8+8]

3. (a) State the uses of compressed air in engineering.
   (b) Working from first principles, derive an expression for work done on air in a reciprocating compressor in terms of the pressure ratio. [6+10]

4. (a) How do you classify the refrigerants?
   (b) Define the term air conditioning? And explain their uses and applications. [8+8]

5. (a) Indicate the pressure and velocity variation across the centrifugal compressor.
   (b) A single inlet type centrifugal compressor handles 8 kg/s of air with ambient temperature of 20^{o}C. The compressor runs at 2200 rpm with an isentropic η of 82% . Determine the power required if the air is compressed from a stator pressure of 1 bar to 4.2 bar stagnat pressure. Air enters the impeller eye with a velocity of 150 m/s with no prewhirl. [16]

6. (a) Explain the working of a four stroke c.i. engine with a neat sketch.
   (b) Explain the mechanism for load control in c.i. engines. [16]

7. (a) A diesel engine has a compression ratio of 14 to 1 and the fuel supply is cut off at 0.08 of the stroke. If the mass of the fuel is 0.2685 kg/kWh, having calorific value of 43700 kj/ kg. Determine the relative efficiency of the engine.
   (b) Define volumetric efficiency for a four stroke cycle engine. [16]

8. (a) How can be the possibility of detonation be reduced at the design stage in S.I. engines.

   (b) Explain the desirable point in the cycle to obtain the peak pressure and discuss its importance. [16]

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